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(54) MIXING DEVICE AND AFTERTREATMENT DEVICE

MISCHVORRICHTUNG UND NACHBEHANDLUNGSVORRICHTUNG

DISPOSITIF DE MÉLANGE ET DISPOSITIF DE POST-TRAITEMENT

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(73) Proprietor: **Daimler AG**

70372 Stuttgart (DE)

(72) Inventors:

- **QUAN, Peng**
Novi, MI 48375 (US)

• **KOSIK, Justin**

Canton, MI 48188 (US)

• **BERTCH, Corey**

Canton, MI 48187 (US)

• **CARUTH, Eric**

Grosse Ile, MI 48138 (US)

(74) Representative: **JENSEN & SON**

366-368 Old Street

London EC1V 9LT (GB)

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Description

[0001] The invention relates to a mixing device for mixing exhaust gas from a combustion engine of a vehicle with a solution for lowering the content of nitrogen oxides in the exhaust gas. The invention further relates to an aftertreatment device comprising such a mixing device.

[0002] Documents EP2465602 and JP2010180863 describe a device for exhaust gas cleaning, wherein an aqueous urea solution is introduced into an exhaust gas flow flowing through an exhaust gas passage. With the aid of a flow guide the exhaust gas flow is divided into a centre flow flowing in the centre of the cross section of the exhaust gas passage and an edge flow circulating and advancing around the centre flow. The flow guide has an inner duct for the centre flow and blades arranged on the inner duct for steering the exhaust gas into a motion circulating the inner duct. The inner duct and the blades are placed within a casing.

[0003] Document EP 2 578 828 A1 describes a mixing device for mixing exhaust gas from a combustion engine of a vehicle with a solution for lowering the content of nitrogen oxides in the exhaust gas, wherein the mixing device comprises a casing with an exhaust inlet, an exhaust outlet and a corner region in which an exhaust gas flow is diverted towards the exhaust outlet. The corner region has an opening for a dosing unit, and wherein the mixing device comprises flow guides arranged within the casing, which are configured to divide a total of the exhaust gas flow into several exhaust gas streams.

[0004] Effective mixing of a solution for lowering the content of nitrogen oxides in exhaust gas, such as an aqueous urea solution, with the exhaust gas is critical in developing an effective SCR system in an aftertreatment system or aftertreatment device. It is further critical to mitigate or eliminate the deposit of urea within the aftertreatment device. This is especially valid under the conditions of elevated engine NO_x emissions. When the aqueous urea solution is fed into the exhaust gas, ammonia (NH_3) forms upon the hydrolysis of urea in the hot exhaust gas. This ammonia reacts with the nitrogen oxides (NO_x) that are present in the exhaust gas in a selective catalytic reduction (SCR) reaction within an SCR-catalyst of the aftertreatment system.

[0005] However, it was found that urea deposits can form within the urea mixing device. Excessive urea deposits can even clog the urea doser. In such a case, the vehicle equipped with the aftertreatment system comprising the mixing device would be forced to stop for service.

[0006] It is therefore the object of the present invention to provide an improved mixing device and an aftertreatment device comprising such a mixing device.

[0007] This object is solved by a mixing device having the features of claim 1 and by an aftertreatment device having the features of claim 9. Advantageous configurations with convenient further developments of the invention are specified in the dependent claims.

[0008] The mixing device according to the invention is configured for mixing exhaust gas from a combustion engine of a vehicle with a solution for lowering the content of nitrogen oxides in the exhaust gas. The mixing device comprises a casing with an exhaust inlet, an exhaust outlet and a corner region. In the corner region, an exhaust gas flow is diverted towards the exhaust outlet. The corner region has an opening for a dosing unit. The mixing device further comprises a flow guide arranged within the casing. The flow guide is configured to divide a total of the exhaust gas flow into a first exhaust gas stream and a second exhaust gas stream. Herein, a gap for the second exhaust gas stream is formed between the flow guide and a side wall of the casing, in which the opening for the dosing unit is located. An end region of the flow guide is arranged upstream of the opening for the dosing unit.

[0009] The invention is based on the finding that due to the form of the casing of the mixing device, in particular due to the configuration of the corner region, there is an intrinsic flow recirculating region within the mixing device which leads to an effective mixing of the solution, in particular the aqueous urea solution, and the exhaust gas. However, the recirculation of exhaust gas back towards the opening for the dosing unit carries a lot of urea spray or droplets back to the urea dosing unit area. This spray or these droplets then hit the side wall to which the dosing unit or doser is mounted, if the flow guide is not arranged in front of the side wall. This can lead to the formation of deposits of urea in the area of the opening for the dosing unit.

[0010] In the improved mixing device, the flow guide, which functions as a splitting baffle, is added or arranged upstream of the opening for the dosing unit or doser mount. The flow guide thus forms a separate flow passage comprising the gap for the second exhaust gas stream. In this gap or flow passage, a part of the upstream, clean exhaust gas is accelerated in the operation of the mixing device. Consequently, the second exhaust gas stream washes over the side wall in which the opening for the dosing unit is located. Therefore, this side wall or the doser mount surfaces are successfully protected from deposits. Further, the exhaust flow or second exhaust gas stream through the passage or gap allows for an intensive interaction with the existing flow structure. This further improves the mixing and subsequently improves the uniformity of ammonia distribution at substrates of an SCR-catalyst arranged downstream of the mixing device in a corresponding aftertreatment device.

[0011] By providing the mixing device with the gap formed between the flow guide and the side wall of the casing, the deposit of urea can be significantly reduced. This results in savings in repair costs and the consumption of the solution for lowering the content of nitrogen oxides in the exhaust gas, which is for example commercially available under the name AdBlue®. As only the flow guide with its specific geometry and dimensions needed to be added to a casing of existing geometry,

significant cost savings with respect to tooling and redesign efforts have been achieved.

[0012] Also, the mixing device is particularly simple with respect to the design and therefore significantly inexpensive. Further, the mixing device is very compact and effective in mixing and in the mitigation of urea deposit. The mixing device therefore has a high potential for use in applications with limited space, e.g. in particular in vehicles. Also, the back pressure of the mixing device is very low. This is beneficial for the integration of the mixing device into an aftertreatment system of a vehicle.

[0013] According to the invention, the casing has a bend in which the exhaust gas flow is diverted from the exhaust inlet towards the corner region. Herein, an upstream end region of the flow guide reaches into the bend and the corner region provides a flat surface for the installation of the dosing unit. Such an arrangement allows for an improved diversion of the second exhaust gas stream from the first exhaust gas stream.

[0014] Preferably, in the upstream end region, the flow guide has a rear edge, which is formed as a curved line, wherein the curved line is oriented towards the opening for the dosing unit. This helps in diverting only a fraction of the total of the exhaust gas flow as the second exhaust gas stream through the gap.

[0015] The casing can have a tapered region upstream of the exhaust outlet. A diameter of the casing which can be passed by the exhaust gas decreases in the tapered region. The provision of such a tapered region close to the exhaust outlet is beneficial for the formation of a recirculating region within the mixing device, i.e. a region in which spray or droplets of the solution move backwards, i.e. towards the opening for the dosing unit. This improved recirculation leads to a more effective mixing of the solution with the exhaust gas.

[0016] In a particularly simple embodiment, the flow guide is formed as a flat plate having two lateral edges. The plate can be fixed to the casing along at least a portion of at least one of the lateral edges.

[0017] Preferably, in the end region of the flow guide, which is arranged upstream of the opening for the dosing unit, the flow guide has a front edge which is formed as a straight line. Thus, a well-defined tearing edge of the flow guide is provided which enhances the mitigation or elimination of deposits on the side wall having the opening for the dosing unit and/or on the dosing unit. The straight line can in particular be parallel to the side wall of the casing.

[0018] Finally, it has proven advantageous if the flow guide has a plurality of through holes.

[0019] The aftertreatment device according to the invention comprises a mixing device according to the invention. The mixing device is arranged within an exhaust line. In the exhaust line, an SCR-catalyst is arranged downstream of the mixing device.

[0020] The advantages and preferred embodiments described with respect to the mixing device correspondingly apply to the aftertreatment device.

[0021] The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respectively specified combination, but also in other combinations or alone, without departing from the scope of the invention. Thus, implementations are also to be considered as encompassed and disclosed by the invention, which are not explicitly shown in the figures or explained, but arise from and can be generated by separated feature combinations from the explained implementations. Therefore also embodiments and feature combinations shall be considered as disclosed, which do not have all the features of an originally formulated independent claim.

[0022] Further advantages, features and details of the invention are apparent from the claims, the following description of preferred embodiments as well as based on the drawings in which features having analogous functions are designated with the same reference signs. Therein show:

Fig. 1 a perspective view of components of an aftertreatment device for a vehicle, wherein the components comprise a mixing device;

Fig. 2 an enlarged, perspective view of the mixing device;

Fig. 3 an enlarged section view of the mixing device;

Fig. 4 a further perspective view of the mixing device; and

Fig. 5 another perspective view of the mixing device.

[0023] Fig. 1 shows components of an aftertreatment device 10 for a vehicle. The aftertreatment device 10 comprises aftertreatment units such as an SCR-catalyst 12 and a further aftertreatment unit such as a diesel particulate filter 14. The aftertreatment units are fluidly connected to each other through an exhaust line 16, which comprises a mixing device 18. In variants of the aftertreatment device 10, a particulate filter or an SCR-coated particulate filter can be arranged downstream of the mixing device 18. Further, the aftertreatment device 10 can have other or less than the exemplarily shown aftertreatment units.

[0024] In the mixing device 18, which is shown in greater detail in Fig. 2, a solution for lowering the content of nitrogen oxides in the exhaust gas, for example a urea solution 20, is injected into the exhaust gas flowing through the mixing device 18. The urea solution 20, which is injected into the mixing device 18 by a (not shown) dosing unit such as a urea doser, is illustrated as a spray cone in Fig. 2. A side wall 22 of a casing 24 of the mixing device 18 has an opening 26. The opening 26 receives a mounting structure 28 (see Fig. 5), which holds the urea

doser (not shown). Through a nozzle of the urea doser the urea solution 20 is injected into the casing 24.

[0025] The casing 24 has an exhaust inlet 30 and an exhaust outlet 32 (see Fig. 2). The exhaust gas entering the mixing device 18 through the exhaust inlet 30 is illustrated in Fig. 2 by a first arrow 34. A mixture which comprises the urea solution 20 and the exhaust gas and which leaves the mixing device 18 through the exhaust outlet 32 is illustrated by a further arrow 36 in Fig. 2. From the exhaust inlet 30 of the mixing device 18, the exhaust gas first flows through a bend 38 of the casing. In the bend 38 the exhaust gas flow is diverted from the exhaust inlet 30 towards a corner region 40 of the casing 24.

[0026] The corner region 40 substantially has an L-shape. However, the inflow direction of the exhaust gas flowing into the exhaust inlet 30 substantially coincides with the outflow direction of the mixture comprising the exhaust gas and the urea solution 20 and leaving the exhaust outlet 32. The mixing device 18 is therefore particularly well adapted for an arrangement within the aftertreatment device 10 in which two aftertreatment units such as a diesel particulate filter 14 and the SCR-catalyst 12 are arranged in a substantially horizontal configuration. In such a configuration, a compact mixing device 18 is required due to space limitations.

[0027] At the exhaust outlet 32, the mixing device 18 is connected to a straight pipe 42 of the exhaust line 16 (see Fig. 1). There are mixing devices in which the mixing of the exhaust gas with the urea solution 20 mainly takes place after the urea droplets have been carried by the exhaust gas to this downstream straight pipe 42. This leads to a more diffusion-like mixing mechanism, since normally forced mixing inside a straight pipe 42 is not very strong or effective.

[0028] However, in the mixing device 18 shown in Fig. 2, the primary mixing mechanism is forced mixing. The mixing mainly takes place at the corner of the mixing device 18, i.e. within the corner region 40. Correspondingly, Fig. 3 shows a recirculating region 44 within the casing 24, in which the exhaust gas flowing through the mixing device 18 has a particularly low speed. Flow structures 46 in the recirculating region 44 are indicated in Fig. 3 by circles. These flow structures lead to an enhanced mixing of the urea solution 20 with the exhaust gas. In other words, within the corner region 40 of the mixing device 18, a few exhaust swirls naturally exist due to the geometry of the casing 24.

[0029] However, this recirculation of droplets of the urea solution 20 can lead to the formation of urea deposits on the side wall 22 and/or on a nozzle of the urea doser. The formation of such deposits is prevented by the arrangement of a flow guide configured as a plate-like splitting baffle 48 within the casing 24 (see Fig. 2). The baffle 48 which is configured as a flat plate divides a total of the exhaust gas flow which enters the mixing device 18 through the exhaust inlet 30 into a first, main exhaust gas stream 50 and a much smaller second exhaust gas stream 52 (see Fig. 3).

[0030] The main exhaust gas stream or first exhaust gas stream 50 is characterized by higher speeds of the exhaust gas within the casing 24 than the speeds that exist within the recirculating region 44. The second exhaust gas stream 52 is illustrated in Fig. 3 by an arrow. This second exhaust gas stream 52 flows through a gap 54 between the baffle 48 and the side wall 22 in which the opening 26 for the urea doser is located.

[0031] Through the gap 54 a part of the total exhaust gas flow, which forms the second exhaust gas stream 52, flows with high speed towards the opening 26 and therefore towards the location where the urea solution 20 is injected into the mixing device 18. This high-speed clean exhaust in the splitting flow passage prevents the formation of urea deposits around the urea doser within the mixing device 18. The second exhaust gas stream 52 also strongly interacts with the complex flow structure 46 in the recirculating region 44, which further enhances the mixing between urea spray and exhaust flow.

[0032] A downstream end region 56 of the baffle 48 is arranged upstream of the opening 26 for the urea doser. On the other hand, an upstream end region 58 of the baffle 48 reaches into the bend 38 of the casing 24. As the gap 54 is rather small, i.e. as the baffle 48 is arranged very close to the side wall 22, the second exhaust gas stream 52 is much smaller than the main exhaust gas flow or first exhaust gas stream 50. For example, a width of the gap 54 can be about 10 mm to 15 mm, in particular about 12 mm.

[0033] As can be seen particularly well from Fig. 4, the end region 56 of the baffle 48 can have a front edge 60, which is formed as a straight line and which can in particular be parallel to the side wall 22 of the casing 24. Further, the baffle 48 can be fixed to the casing 24 along lateral edges 62, 64 of the baffle 48. In the upstream end region 58, the baffle 48 can have a rear edge 66, which can be formed as a curved line. Herein, the curved line can be oriented towards the opening for the urea doser (see Fig. 4). Further, the baffle 48 can have a plurality of through holes 68.

[0034] As can be seen from Fig. 3, the casing 24 can have a tapered region 70 upstream of the exhaust outlet 32. In the tapered region 70, a diameter of the casing decreases, which can be passed by the exhaust gas. This shape of the casing 24 contributes to the formation of the recirculating region 44 within the mixing device 18.

[0035] After the forced mixing, which takes place primarily in the recirculating region 44, the mixture of the urea solution 20 and the exhaust gas is further mixed with the main exhaust stream at the entrance of the straight pipe 42, i.e. after the mixing device 18. This multiple stage mixing mechanism significantly improves the urea evaporation rate and produces a high uniformity of a mixture containing ammonia (NH₃) and exhaust gas when substrate surfaces of the SCR-catalyst 12 (see Fig. 1) are reached.

[0036] In particular the bend 38 and the L-shape of the corner region 40 in the design of the mixing device 18

naturally form the flow recirculating region 44. Also, the L-shape of the corner region 40 provides a flat surface for the installation of the urea doser. The splitting baffle 48 guides a part of the incoming exhaust flow, i.e. clean exhaust gas or exhaust gas without urea, to the region of the side wall 22 where the urea doser is mounted. Thus, the urea doser mount area is protected from being contaminated by recirculated urea. Also, the division of the total exhaust gas flow into the main or first exhaust gas stream 50 and the second exhaust gas stream 52 provides further chances for the mixing of the urea solution 20 with the exhaust gas in the recirculating region 44.

[0037] From Fig. 4 as well as from Fig. 5 can also well be seen that the main flow direction of the exhaust gas entering the exhaust inlet 30 and of the urea/exhaust gas mixture leaving the mixing device 18 at the exhaust outlet 32 substantially coincide.

List of reference signs

[0038]

10	aftertreatment device
12	SCR-catalyst
14	diesel particulate filter
16	exhaust line
18	mixing device
20	urea solution
22	side wall
24	casing
26	opening
28	mounting structure
30	exhaust inlet
32	exhaust outlet
34	arrow
36	arrow
38	bend
40	corner region
42	pipe
44	recirculating region
46	flow structure
48	baffle
50	first exhaust gas stream
52	second exhaust gas stream
54	gap
56	end region
58	end region
60	front edge
62	lateral edge
64	lateral edge
66	rear edge
68	through hole
70	tapered region

Claims

1. Mixing device for mixing exhaust gas from a com-

bustion engine of a vehicle with a solution (20) for lowering the content of nitrogen oxides in the exhaust gas, wherein the mixing device (18) comprises a casing (24) with an exhaust inlet (30), an exhaust outlet (32) and a corner region (40) in which an exhaust gas flow is diverted towards the exhaust outlet (32), wherein the corner region (40) has an opening (26) for a dosing unit, and wherein the mixing device (18) comprises a flow guide (48) arranged within the casing (24), which is configured to divide a total of the exhaust gas flow into a first exhaust gas stream (50) and a second exhaust gas stream (52),

characterized in that

a gap (54) for the second exhaust gas stream (52) is formed between the flow guide (48) and a side wall (22) of the casing (24), in which the opening (26) for the dosing unit is located, wherein an end region (56) of the flow guide (48) is arranged upstream of the opening (26) for the dosing unit and the casing (24) has a bend (38) in which the exhaust gas flow is diverted from the exhaust inlet (30) towards the corner region (40), wherein an upstream end region (58) of the flow guide (48) reaches into the bend (38) and the corner region (40) provides a flat surface for the installation of the dosing unit.

2. Mixing device according to claim 1,

characterized in that

in the upstream end region (58) the flow guide (48) has a rear edge (66) which is formed as a curved line which is oriented towards the opening (26) for the dosing unit.

3. Mixing device according to any one of claims 1 or 2,

characterized in that

the casing (24) has a tapered region (70) upstream of the exhaust outlet (32) and close to the exhaust outlet (32), wherein a diameter of the casing (24) which can be passed by the exhaust gas decreases in the tapered region (70).

4. Mixing device according to any one of claims 1 to 3,

characterized in that

the flow guide (48) is formed as a flat plate having two lateral edges (62, 64).

5. Mixing device according to claim 4,

characterized in that

the plate is fixed to the casing (24) along at least a portion of at least one of the lateral edges (62, 64).

6. Mixing device according to any one of claims 1 to 5,

characterized in that

in the end region (56) of the flow guide (48), which is arranged upstream of the opening (26) for the dosing unit, the flow guide (48) has a front edge (60) which is formed as a straight line.

7. Mixing device according to claim 6,
characterized in that
the straight line is parallel to the side wall (22) of the casing (24).
8. Mixing device according to any one of claims 1 to 7,
characterized in that
the flow guide (48) has a plurality of through holes (68).
9. Aftertreatment device (10) comprising a mixing device (18) according to any one of claims 1 to 8 arranged within an exhaust line (16), wherein in the exhaust line (16) an SCR-catalyst (12) is arranged downstream of the mixing device (18).

Patentansprüche

1. Mischvorrichtung zum Mischen von Abgas aus einem Verbrennungsmotor eines Fahrzeugs mit einer Lösung (20) zur Verringerung des Gehalts an Stickstoffoxiden im Abgas, wobei die Mischvorrichtung (18) ein Gehäuse (24) mit einem Abgaseinlass (30), einem Abgasauslass (32) und einem Eckbereich (40) umfasst, in dem ein Abgasstrom zum Abgasauslass (32) abgeleitet wird, wobei der Eckbereich (40) eine Öffnung (26) für eine Dosiereinheit hat, und wobei die Mischvorrichtung (18) eine im Gehäuse (24) angeordnete Strömungsführung (48) umfasst, die zur Teilung einer Gesamtheit des Abgasstroms in einen ersten Abgasstrom (50) und einen zweiten Abgasstrom (52) ausgelegt ist,
dadurch gekennzeichnet, dass
zwischen der Strömungsführung (48) und einer Seitenwand (22) des Gehäuses (24) ein Spalt (54) für den zweiten Abgasstrom (52) gebildet ist, in dem die Öffnung (26) für die Dosiereinheit angeordnet ist, wobei ein Endbereich (56) der Strömungsführung (48) stromauf der Öffnung (26) für die Dosiereinheit angeordnet ist und das Gehäuse (24) einen Bogen (38) hat, in dem der Abgasstrom vom vom Abgaseinlass (30) zum Eckbereich (40) abgeleitet wird, wobei ein Stromauf-Endbereich (58) der Strömungsführung (48) in den Bogen (38) reicht und der Eckbereich (40) eine ebene Fläche für die Montage der Dosiereinheit bereitstellt.
2. Mischvorrichtung nach Anspruch 1,
dadurch gekennzeichnet, dass
der Stromauf-Endbereich (58) der Strömungsführung (48) einen hinteren Rand (66) hat, der als eine gekrümmte Linie ausgebildet ist, die in Richtung der Öffnung (26) für die Dosiereinheit ausgerichtet ist.
3. Mischvorrichtung nach Anspruch 1 oder 2,
dadurch gekennzeichnet, dass
das Gehäuse (24) stromauf des Abgasauslasses

(32) und in der Nähe des Abgasauslasses (32) einen konischen Bereich (70) hat, wobei ein Durchmesser des Gehäuses (24), an dem das Abgas vorbeiströmen kann, im konischen Bereich (70) abnimmt.

4. Mischvorrichtung nach einem der Ansprüche 1 bis 3,
dadurch gekennzeichnet, dass
die Strömungsführung (48) als eine ebene Platte mit zwei Seitenkanten (62, 64) ausgebildet ist.
5. Mischvorrichtung nach Anspruch 4,
dadurch gekennzeichnet, dass
die Platte entlang mindestens einem Abschnitt von mindestens einer der Seitenkanten (62, 64) am Gehäuse (24) befestigt ist.
6. Mischvorrichtung nach einem der Ansprüche 1 bis 5,
dadurch gekennzeichnet, dass
im Endbereich (56) der Strömungsführung (48), der stromauf der Öffnung (26) für die Dosiereinheit angeordnet ist, die Strömungsführung (48) einen vorderen Rand (66) hat, der als eine gerade Linie ausgebildet ist.
7. Mischvorrichtung nach Anspruch 6,
dadurch gekennzeichnet, dass
die gerade Linie parallel zur Seitenwand (22) des Gehäuses (24) verläuft.
8. Mischvorrichtung nach einem der Ansprüche 1 bis 7,
dadurch gekennzeichnet, dass
die Strömungsführung (48) eine Vielzahl von Durchgangsbohrungen (68) hat.
9. Nachbehandlungsvorrichtung (10) umfassend eine Mischvorrichtung (18) nach einem der Ansprüche 1 bis 8, angeordnet innerhalb einer Abgasleitung (16), wobei in der Abgasleitung (16) ein SCR-Katalysator stromab der Mischvorrichtung (18) angeordnet ist.

Revendications

1. Dispositif de mélange pour mélanger le gaz d'échappement provenant d'un moteur à combustion interne d'un véhicule à moteur à une solution (20) pour faire baisser la teneur en oxydes d'azote dans le gaz d'échappement, le dispositif de mélange (18) comprenant un carter (24) doté d'une admission d'échappement (30), d'une sortie d'échappement (32) et d'une région cornière (40) dans laquelle l'écoulement de gaz d'échappement est dévié en direction de la sortie d'échappement (32), la région cornière (40) ayant une ouverture (26) pour une unité de dosage, et le dispositif de mélange (18) comprenant un guide d'écoulement (48) disposé à l'intérieur du carter (24) qui est conçu pour diviser la totalité de l'écoulement de gaz d'échappement en un premier

flux de gaz d'échappement (50) et en un second flux de gaz d'échappement (52),

caractérisé en ce qu'un espace (54) pour le second flux de gaz d'échappement (52) est formé entre le guide d'écoulement (48) et une paroi latérale (22) du carter (24) dans lequel est située l'ouverture (26) pour l'unité de dosage, une région d'extrémité (56) du guide d'écoulement (48) étant disposée en amont de l'ouverture (26) pour l'unité de dosage et le carter (24) ayant un coude (38) dans lequel est dévié l'écoulement de gaz d'échappement provenant de l'admission d'échappement (30) en direction de la région cornière (40), une région d'extrémité en amont (58) du guide d'écoulement (48) parvenant dans le coude (38) et dans la région cornière (40) fournit une surface plate pour l'installation de l'unité de dosage.

2. Dispositif de mélange selon la revendication 1, **caractérisé en ce que** dans la région d'extrémité en amont (58) le guide d'écoulement comporte un bord arrière (66) qui se présente sous la forme d'une ligne incurvée qui est orientée en direction de l'ouverture (26) pour l'unité de dosage.
3. Dispositif de mélange selon l'une quelconque des revendications 1 ou 2, **caractérisé en ce que** le carter (24) comporte une région conique (70) en amont de la sortie d'échappement (32) et à proximité de la sortie d'échappement (32), le diamètre du carter (24) qui peut être traversé par le gaz d'échappement se réduisant dans la région conique (70).
4. Dispositif de mélange selon l'une quelconque des revendications 1 ou 3, **caractérisé en ce que** le guide d'écoulement (48) se présente sous la forme d'une plaque plate comportant deux bords latéraux (62, 64).
5. Dispositif de mélange selon la revendication 4, **caractérisé en ce que** la plaque est fixée au carter (24) le long d'au moins une partie du ou des bords latéraux (62, 64).
6. Dispositif de mélange selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** dans la région d'extrémité (56) du guide d'écoulement (48), qui est disposé en amont de l'ouverture (26) pour l'unité de dosage, le guide d'écoulement (48) comporte un bord avant (60) qui se présente sous la forme d'une ligne droite.
7. Dispositif de mélange selon la revendication 6, **caractérisé en ce que** la ligne droite est parallèle à la paroi latérale (22) du carter (24).
8. Dispositif de mélange selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** le guide

d'écoulement (48) comporte une pluralité de trous traversants (68).

9. Dispositif de post-traitement (10) comprenant un mélangeur (18) selon l'une quelconque des revendications 1 à 8 disposé à l'intérieur d'une ligne d'échappement (16), dans la ligne d'échappement (16) étant disposé un catalyseur RCS (12) en aval du mélangeur (18).

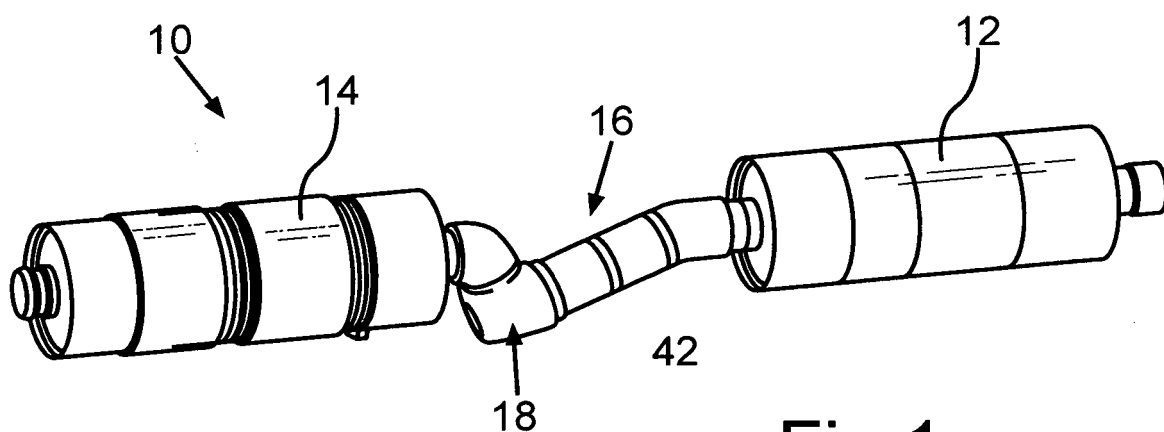


Fig.1

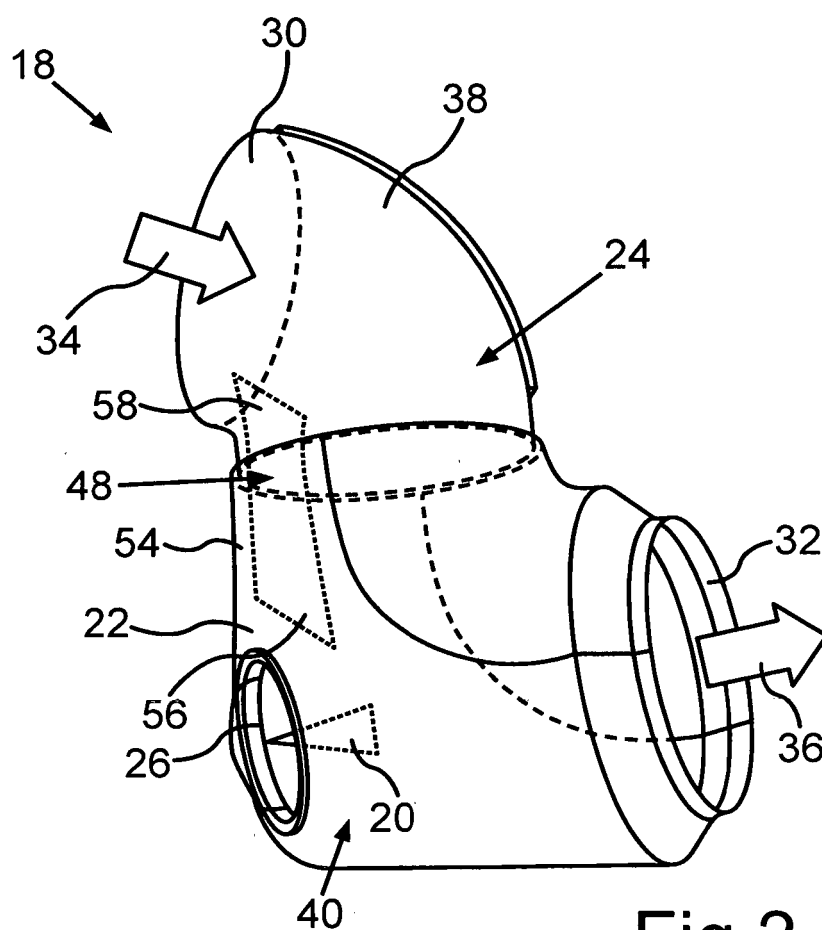


Fig.2

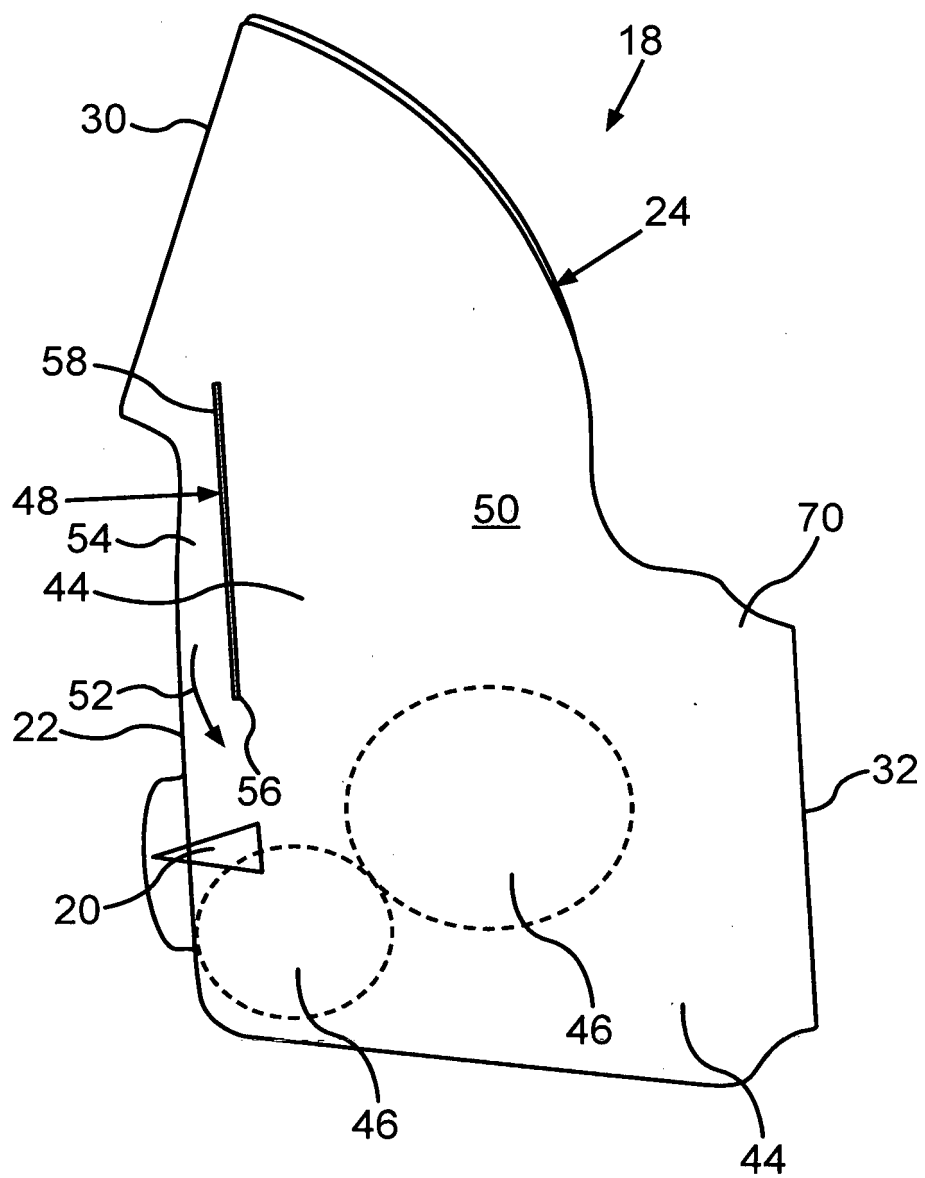


Fig.3

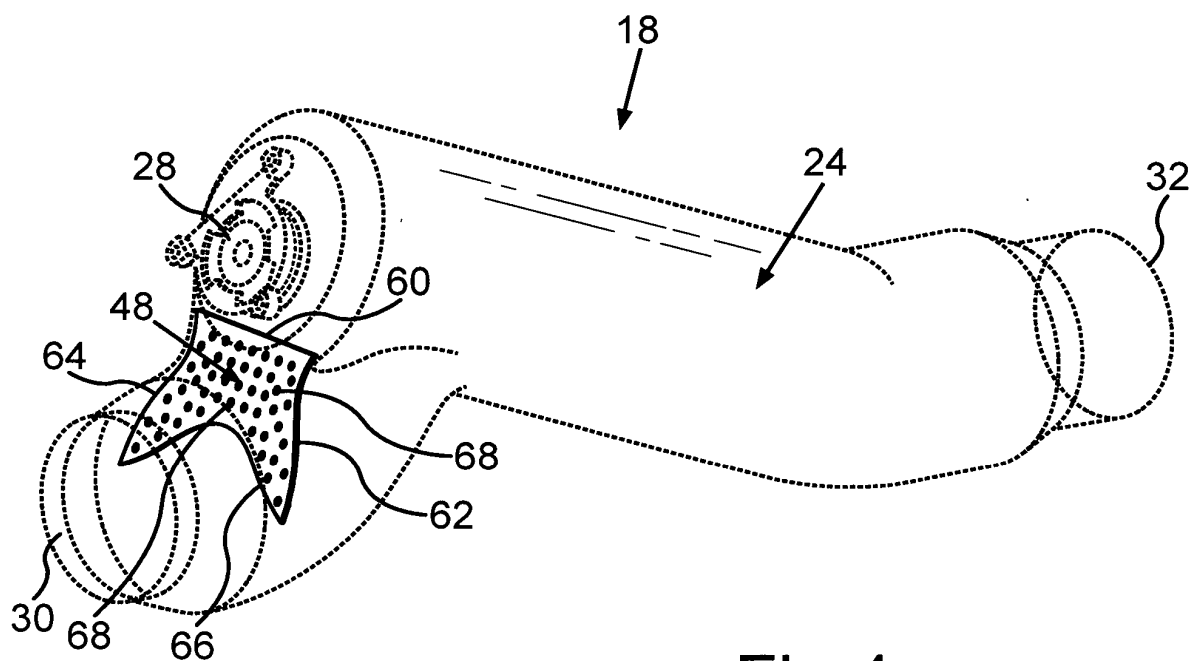


Fig. 4

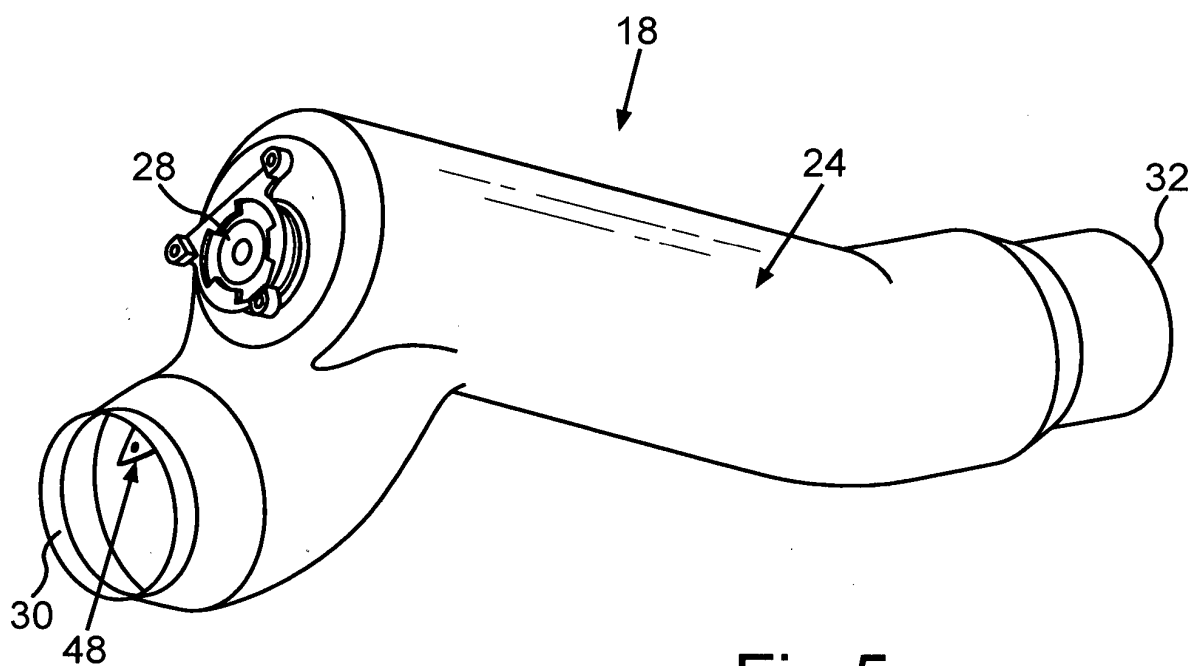


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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